# EXPLORATION SCIENCE FORUM, July 21-23, 2015

| | DAY 1: Tuesday, July 21, 2015 | | | |
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| 7:00 | POSTER SETUP BEGINS | | | BUILDING 152 |
| 7:30 | STUDENT LIGHTNING ROUND PRESENTATIONS: Breakfast with SSERVI Director | | | BUILDING 152 |
| 7:00-8:30 | REGISTRATION | | | BUILDING 152 |
| | PLENARY SESSION 1: Mission Updates Chair: Yvonne Pendleton | | | BUILDING 152 MAIN ROOM |
| 8:30 | Welcome speakers | | | BUILDING 152 MAIN ROOM |
| 8:45 | Award talks: Shoemaker, Wargo, and Neiber Awards | | | BUILDING 152 MAIN ROOM |
| 10:05 | Mission Invited Talk - LRO Mission After 6 Years: What we have learned and what we have yet to learn. Noah Petro | | | |
| 10:25 | Mission Invited Talk - DAWN. Chris Russell | | | |
| 10:45 | BREAK | | | |
| 10:55 | Mission Invited Talk - Osiris-Rex | | | |
| 11:15 | Mission Invited Talk - Artemis. Lunar exospheric ions observed by LADEE and ARTEMIS. Jasper Halekas | | | |
| 11:35 | Mission Invited Talk - NEOWISE. Joe Masiero | | | |
| 11:55 | LUNCH / POSTER VIEWING / Focus Group Sessions | | | |
| | PLENARY SESSION 2: NASA Town Hall Chair: Yvonne Pendleton | | | |
| 2:00 | NASA Town Hall | | | BUILDING 152 MAIN ROOM |
| 2:30 | PLENARY SESSION 3: Mission Updates Continued Chair: Greg Schmidt | | | BUILDING 152 MAIN ROOM |
| 2:30 | Mission Invited Talks- Primary Science Drivers for Lunar Mission One. David Iron | | | |
| 2:50 | Mission Invited Talk - Lunar Mapping and Modeling Portal. Brian Day | | | |
| 3:10 | Parallel Session 1 Overview Talk - FUTURE MISSIONS OF SCIENCE AND EXPLORATION : Lunar Program Status and Lunar Science Research Activities in Korea. Gwanghoek Ju | | | |
| 3:30 | Parallel Session 2 Overview Talk - SHAPING PLANETARY SURFACES WITH IMPACTS AND VOLCANIC PROCESSES: Lunar Magmatism Hypothesis. David Kring | | | |
| 3:50 | Lightning Round #1: Student Poster Previews | | | BUILDING 152 MAIN ROOM |
| 4:00 | Transition to Parallel Session Rooms | | | |
| | Parallel Session #1. FUTURE MISSIONS OF SCIENCE AND EXPLORATION | BUILDING 152 MAIN ROOM | Parallel Session #2. SHAPING PLANETARY SURFACES WITH IMPACTS AND VOLCANIC PROCESSES | BUILDING 152 SIDE ROOM |
| | Chairs: Barb Cohen and Kris Zacny | | Chairs: David Kring and Brent Garry | |
| 4:10 | Lunar Flashlight: Mapping lunar surface volatiles using a cubesat. Barb Cohen | | Numerically modeling mega-scale lunar impact basins. Ross Potter | |
| 4:25 | Mars-Moons exploration, reconnaissance and landed investigation (MERLIN). Steve Murchie | | Inferno Chasm Rift Zone, Idaho: A terrestrial analog for plains-style volcanism in southeastern Mare Serenitatis on the Moon. Brent Garry | |
| 4:40 | Cosmology from the Moon: The dark ages radio explorer (DARE) mission. Jack Burns | | Ascent and eruption of magma on the terrestrial planets: A planetary perspective on the Moon. Jim Head | |
| 4:55 | Lunar hydrosphere explorer (Hydrox). John Cooper | | Detecting volcanic glass in lunar localized dark mantle deposits. Erica Jawin | |
| 5:10 | The resource prospecting mission drill. Kris Zacny | | Evolution of Gas Content and Foam Distribution in Lunar Floor-Fractured Craters. Lauren Jozwiak | |
| 5:25 | Design of Lander PODS For Addressing Small Bodies Strategic Knowledge Gaps. Robert Frampton | | The steepest slopes on the Moon: a clue to understanding geological processes. Mikhail Kreslavsky | |
| 5:40 | Transition to Poster Session | | | |
| 5:45 | POSTER SESSION | | | BUILDING 152 |

| EXPLORATION SCIENCE FORUM, July 21-23, 2015 | | | | |
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| | DAY 2: Wednesday, July 22, 2015 | | | Location/Speaker |
| 8-8:30 | REGISTRATION | | | BUILDING 152 |
| 8:30 | PLENARY SESSION 4: Planetary Crusts and Space Surface Interactions Chair: Brad Bailey | | | BUILDING 152 MAIN ROOM |
| 8:30 | Overview Talk - Asteroid Redirect Mission - Michelle Gates | | | |
| 8:50 | Parallel Session 3 Overview Talk - ORIGIN, EVOLUTION, AND EXPLORATION OF PLANETARY CRUSTS: Comparison of ancient planetary crusts. Chip Shearer | | | |
| 9:10 | Parallel Session 4 Overview Talk - INTERACTIONS BETWEEN SPACE AND PLANETARY SURFACES: What controls the lunar Na exosphere. Menelaos Sarantos | | | |
| 9:30 | Lightning Round #2: Student Poster Previews | | | BUILDING 152 MAIN ROOM |
| 9:40 | Transition to Parallel Session Rooms | | | |
| | Parallel Session #3: ORIGIN, EVOLUTION, AND EXPLORATION OF PLANETARY CRUSTS | BUILDING 152 MAIN ROOM | Parallel Session #4: INTERACTIONS BETWEEN SPACE AND PLANETARY SURFACES I | BUILDING 152 SIDE ROOM |
| | Chairs: Chip Shearer and Lars Borg | | Chairs: Menelaos Sarantos and Dana Hurley | |
| 9:50 | An Age Constraint on the Giant Impact from Lunar Sample Chronology. Lars Borg | | Variability and sources of helium in the lunar exosphere. Dana Hurley | |
| 10:05 | Crustal Stratigraphy Before the Imbrium Impact. Carle Pieters | | Earthshine as an Illumination Source in Permanently Shadowed Regions. David Glenar | |
| 10:20 | Importance of silicic magmatism on the Moon. Justin Simon | | An examination of the LADEE UVS spectral variability associated with the Geminid meteoroid stream. Tony Colaprete | |
| 10:35 | New constraints on the timing of basin-forming impact events from excavated crustal rocks. William Cassata | | Ladee UVS continuum Observations: Evidence of dust in the lunar tail. Amanda Cook | |
| 10:50 | Surface roughness in the SPA. Noah Petro | | Investigations of electrostatic dust lofting and its mechanisms. Xu Wang | |
| 11:05 | Evolution and stratigraphy of SPA. Insights from pyroxene composition and distribution. Dan Moriarty | | On the dynamics of nanodust in the near-lunar space environment. Timothy Stubbs | |
| 11:20 | Scientific motivation for sample return from SPA basin. Brad Jolliff | | Dust charge measurements by LDEX. Mihaly Horanyi | |
| 11:35 | Exploration of Planetary Crusts: A Human/Robotic Exploration Design Reference Campaign to the Orientale Basin. Jim Head | | Experimental investigation of micrometeoroid ablation using dust. Zoltan Sternovsky | |
| 11:50 | Micro-CT of Apollo samples. Ryan Zeigler | | Using the Moon to characterize the near-Earth meteoroid environment. Jamey Szalay | |
| 12:05 | LUNCH / POSTER VIEWING, Focus Group Sessions | | | |
| START 1:30 | PLENARY SESSION 5: Volatiles on Airless Bodies and Human Exploration Chair: Greg Schmidt | | | BUILDING 152 MAIN ROOM |
| 1:30 | Parallel Session 5 Overview Talk - VOLATILE BEHAVIOR, RESERVOIRS, AND RESOURCES ON AIRLESS BODIES: Effects of small-scale surface topography on volatile distributions on airless bodies. Paul Hayne | | | |
| 1:50 | Parallel Session 6 Overview Talk - HUMAN EXPLORATION OF THE MOON AND ASTEROIDS: The Moon's role in exploration of the Solar System. Jeff Plescia | | | |
| 2:10 | EPO Talk - Arecibo Observatory Space Academy. Luisa Zambrano-Marin | | | |
| 2:30 | Lightning Round #3: Student Poster Previews | | | BUILDING 152 MAIN ROOM |
| 2:40 | Transition to Parallel Session Rooms | | | |
| | Parallel Session #5. VOLATILE BEHAVIOR, RESERVOIRS, AND RESOURCES ON AIRLESS BODIES | BUILDING 152 MAIN ROOM | Parallel Session #6. ORIGIN, CHARACTERIZATION, AND EXPLORATION OF SMALL BODIES | BUILDING 152 SIDE ROOM |
| | Chairs: Karl Hibbits and Paul Hayne | | Chairs: Humberto Campins and Robin Canup | |
| 2:50 | Probing planetary bodies for the structure of subsurface volatiles: Geant4 models of fast, epithermal, and thermal neutron flux. Gordon Chin | | The curious disruption of near-Earth asteroids close to the Sun. Bill Bottke | |
| 3:05 | Temperature spectroscopy: Application of laser reflectance of the poles of the Moon and Mercury. Matt Siegler | | Spectral building and space weathering on asteroids. Adrian Brown | |
| 3:20 | Evidence for a diurnal cycling of surface hydration towards the Moon's Mid-latitudes using LRO's LEND Neutron onservation. Timothy McClanahan | | The Polana Family: An Important source of primitive near-Earth asteroids. Humberto Campins | |
| 3:35 | Lunar south pole gravity and the search for water. David Smith | | The main-belt asteroids and NEO tour with imaging and spectroscopy (MANTIS). Andy Rivkin | |
| 3:50 | Monitoring volatiles while drilling into frozen lunar simulant. Ted Roush | | On an impact origin of Phobos-Deimos. Robin Canup | |
| 4:05 | Prospecting on Luna-27. James Carpenter | | Phobos grooves: the inherited signature of an ancient parent body? Maurizio Pajola | |
| 4:20 | Characterizing water on airless bodies from vacuum UV and IR measurements. Karl Hibbits | | The secondary impact spike on Phobos from Stickney crater ejecta. Kenneth Ramsley | |
| 4:35 | Transition to MAIN ROOM | | | |
| 4:45 | LEAG/SBAG meeting Chip Shearer and Dan Britt | | | BUILDING 152 MAIN ROOM |

| EXPLORATION SCIENCE FORUM, July 21-23, 2015 | | | | |
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| | DAY 3 Thursday, July 23, 2015 | | | Location/Speaker |
| 8-8:30 | REGISTRATION | | | BUILDING 152 |
| 8:30 | PLENARY SESSION 6: Human Exploration Drivers, Regolith, and Dust Chair: Brad Bailey | | | BUILDING 152 MAIN ROOM |
| 8:30 | Global Exploration Roadmap - Science White Paper Update | | | |
| 8:50 | Developing Mission Invited Talk - MoonRIDERS: NASA and Hawaii's lunar surface flight experiment for late 2016. Rob Kelso | | | |
| 9:10 | Parallel Session 7 Overview Talk - Origin, Characterization and Exploraiton of Small Bodies: The Mission Asteroids: Science and Exploration in the Space Age. Derek Sears | | | |
| 9:30 | Parallel Session 8 Overview Talk - Interactions between space and planetary surfaces II. An evaluation of space weathering factors and lunar regolith simulants versus Apollo rocks and soils. A missing property. Larry Taylor | | | |
| 9:50 | Transition to Parallel Session Rooms | | | |
| | Parallel Session #7. HUMAN EXPLORATION OF THE MOON AND ASTEROIDS | BUILDING 152 MAIN ROOM | Parallel Session #8. Interactions between space and planetary surfaces II. | BUILDING 152 SIDE ROOM |
| | Chairs: Jeff Plescia and Kurt Klaus | | Chairs: Andrew Poppe and Amanda Hendrix | |
| 10:00 | Solar thermal propulsion: the practical technology for Solar System exploration. David Gump | | LRO/CRATER discoveries of the lunar radiation environment and lunar regolith alteration by radiation. Nathan Schwadron | |
| 10:15 | Advances laser retroreflectors for Solar System Exploration, Geophysical Networks and lasercomm. Simone Dell'Agnello | | Regional Variations in UV Lunar Signatures. Amanda Hendrix | |
| 10:30 | A comparative assessment of delivering consumable resources versus in situ resource utilization for Moon and Mars. Kurt Klaus | | Solar wind access to lunar regolith DEM modeling. Anton Kulchitskiy | |
| 10:45 | Developing planetary protection requirements for human extraterrestrial missions: Workshop report. Margaret Race | | Electromagnetic PIC simulations of the solar wind interactions with lunar magnetic anomalies: Ion and electron dynamics. Jan Deca | |
| 11:00 | Investigating the role of field portable geochemical instrumentation in planetary field geologic operations. Kelsey Young | | Plasma interactions with lunar magnetic anomales. Shahab Fatemi | |
| 11:15 | A planetary science field training and research program at the Zuni-Bandera volcanic field. Jake Bleacher | | Plasma modeling of solar wind interaction with the Reiner Gamma and Airy magnetic anomalies: Implications for surface weathering. Andrew Poppe | |
| 11:30 | Asynchronous geological exploration operations at the HI-SEAS planetary surface analog simulation in Hawaii. Brian Shiro | | Diviner lunar radiometer observations of lunar swirls. Tim Glotch | |
| 11:45 | A cautionary tale about volatile-rich carbonaceous chondrites. Dan Britt | | Nature and origin of lunar swirls. David Blewett | |
| 12:00-1:30 | LUNCH/POSTER VIEWING | | | |
| | Continued - Parallel Session #7. HUMAN EXPLORATION OF THE MOON AND ASTEROIDS | BUILDING 152 MAIN ROOM | Continued - Parallel Session #8. Interactions between space and planetary surfaces II. | BUILDING 152 SIDE ROOM |
| | Chairs: Rob Kelso and Jake Bleacher | | Chairs: Joshua Bandfield and Joshua Cahill | |
| 1:30 | Testing the incorporation of portable infrared imaging for future human missions: Second year of Field work. Gen Ito | | EELS measurement of Fe oxidation state in space-weathered lunar soils. Katherine Burgess | |
| 1:45 | The effect of portable science instruments on EVAs as used by astronauts during geologic exploration of the Solar System. Jake Bleacher | | The Maturely, Immature Orientale Impact Basin. Joshua Cahill | |
| 2:00 | The need for conductive space suits: A summary of DREAM2 findings. Bill Farrell | | Simulating lunar eclipse in the lab. Key to understanding the epiregolith. Ben Greenhagen | |
| 2:15 | A Comparative Assessment of Delivering Consumable Resources Versus In-Situ Resource Utilization for Moon and Mars. Kurt Klaus | | Getting the temperature right-Accurately determining the thermophysical and spectral properties of planetary surfaces. Joshua Bandfield | |
| 2:30 | Spacecraft/Rover hybrids for the exploration of small Solar System bodies. Benjamin Hockman | | Possible dielectric breakdown weathering effects on the comminution of lunar regolith. Andrew Jordan | |
| 2:45 | Particle radiation environment and their effects at exploration destinations. Harlan Spence | | Asteroid material shielding potential against high energy particles. Leos Pohl | |
| 3:00 | Transition to MAIN ROOM | | | |
| 3:10 | PLENARY SESSION 7: Chair: Yvonne Pendleton | | | BUILDING 152 MAIN ROOM |
| 3:10 | Lunar Exploration in ESA. James Carpenter | | | |
| 3:30 | Future of Field Campaign Research: Jennifer Heldmann | | | |
| 3:50 | Student Poster Awards | | | |
| 4:00 | Keynote Talk (Invited) | | | |
| 4:30 | Closing Remarks | | | |

| ORDER | | POSTER PRESENTATIONS | |
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| **POSTER SESSION I** | | **Future Missions of Science and Exploration** | |
| | 1 | Probing the Lunar Atmosphere: Prototype of the Lunar Atmosphere Monitoring Station | Belov |
| | 2 | Mothership for Nanosatellites to Near Earth Asteroids, Moon and Mars | DiCorcia |
| | 3 | Design of Lander PODS For Addressing Small Bodies Strategic Knowledge Gaps | Frampton |
| | 4 | MoonRIDERS: Planning for a 2016 Hawaii High School Dust Mitigation Experiment on the Surface of the Moon | Bishop |
| | 5 | Asteroid Resource Extraction Models Utlizing Efficiency-Discounted Exponential Growth (EDEG) Approach | Ciotola |
| | 6 | Challenges of Rover Navigation at the Lunar Poles | Deans |
| | 7 | Selection and Characterization of Landing Sites for the Upcoming Russian Robotic Missions to the Moon | Head |
| | 8 | FINESSE: Field Investigations to Enable Solar System Science and Exploration | Heldmann |
| | 9 | Asteroid Deflection By Subsurface Blasting | Veerkamp |
| | 10 | Design and Development of the Telerobotic Simulation System (TSS) for Remote Control of Teleoperated Rovers on the Moon | Womack |
| | 11 | Testing Remote Control of Teleoperated Rovers using Telerobotic Simulation System (TSS) | Marx |
| | 12 | Planetary basalt construction-Robotically-building a basalt landing pad. | Kelso |
| **POSTER SESSION II** | | **SHAPING PLANETARY SURFACES WITH IMPACTS AND VOLCANIC PROCESSES** | |
| | 13 | Inferno Chasm Rift Zone, Idaho: A terrestrial analog for plains-style volcanism in southeastern Mare Serenitatis on the Moon | Garry |
| | 14 | Geology of Lunar Cold Spot Craters | Plescia |
| | 15 | Constraints on the Depth of Origin of Peak Rings on the Moon | Baker |
| | 16 | Lunar non-mare volcanism: Topographic configuration, morphology, ages, and internal structure of the Gruithuisen domes. | Head |
| | 17 | Dating of shocked rocks on planetary bodies: Insight from the Manicouagan Impact Structure, Canada. | Jaret |
| **POSTER SESSION III** | | **ORIGIN, EVOLUTION, AND EXPLORATION OF PLANETARY CRUSTS** | |
| | 18 | The steepest slopes on the Moon: a clue to understanding geological processes | Kreslavsky |
| | 19 | Exploring the Moonâ€™s surface for remnants of the lunar mantle 2. Dunite clasts & individual high-Mg# olivines in lunar breccias | Shearer |

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| | 20 | Synthesis of Iron Bearing Anorthitic Plagioclase as a Spectroscopic Analog to the Lunar Ferroan Anorthosites | DiFrancesco |
| | 21 | Significant comparison of two tectonic triads: terrestrial Pacific Ocean - Malay Archipelago - Indian Ocean and lunar Procellaru | Kochemasov |
| **POSTER SESSION IV** | | **INTERACTIONS BETWEEN SPACE AND PLANETARY SURFACES** | |
| | 22 | Earthshine as an Illumination Source in Permanently Shadowed Regions | Glenar |
| | 23 | Hidden in the Neutrons: Physical Evidence for Lunar True Polar Wander | Keane |
| | 24 | Investigating Diurnal Variation in Mapped Lunar Neutron Emission Flux | Livengood |
| | 25 | Comparison between a few Maturity Indicators for the Lunar Regolith: OMAT, mean grain size, and the color ratio of the parallel- | SIM |
| | 26 | Exploring Weaker Lunar Magnetic Anomalies and Lesser-known Swirls with LRO Data | Blewett |
| | 27 | Exospheres from Asteroids to Planets | Burger |
| | 28 | Apollo-era Magnetic Field Data for Sounding the Lunar Interior | Chi |
| | 29 | Isolating Electromagnetic Induction from the Lunar Interior measured with ARTEMIS | Fuqua |
| | 30 | Irradiation Effects on the Adsorption Properties of Silicate Minerals | McLain |
| | 31 | On the Creation of Complex Organic Molecules through Micrometeoroid Bombardment in the Laboratory | Munsat |
| | 32 | Apollo ALSEP/SIDE Ion Observations During Periods of Intense Ion Cyclotron Wave Activity Observed by the Apollo LSM | Newheart |
| | 33 | Particle Size Effects on Minerals Under Simulated Lunar Environment | Shirley |
| | 34 | The MERLIN Phobos Ionizing Radiation Experiment (MPIRE) | Smith |
| | 35 | Impact of Meteoroid Streams on the Lunar Environment: Results from LADEE | Stubbs |
| | 36 | Laboratory Micrometeoroid/Dust Ablation Studies | Thomas |
| | 37 | Fine Particle Charging Rate Limit Modification to Grain Dynamics in Abrupt and Gradual Inhomogeneities | Walker |
| | 38 | Lunar Albedo Proton Anomalies | Wilson |
| | 39 | Micro-magnetosphere formation on the Moon | Zimmerman |
| | 40 | Neutron Spectrometer Prospecting in the Mojave Volatiles Project Analog Field Test | Elphic |
| | 41 | Survival times of meter-sized rock boulders on the surface of airless bodies. | Head |
| **POSTER SESSION V** | | **VOLATILE BEHAVIOR, RESERVOIRS, AND RESOURCES ON AIRLESS BODIES** | |
| | 42 | Peroxy in Lunar Rocks and Regolith: Memory of a Wet Past | Freund |

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| | 43 | Characterizing water on airless bodies from vacuum UV and IR measurements | Hibbitts |
| | 44 | Evolution of Gas Content and Foam Distribution in Lunar Floor-Fractured Craters | Jozwiak |
| | 45 | Quantifying the Lunar Hydrogen Cycle | Collier |
| | 46 | Lunar Polar Hydrogen: Studies in 2D and 3D | Disher |
| | 47 | Temperature Programmed Desorption Studies of Water Chemisorption Interactions with Apollo Lunar Samples | Hibbitts |
| | 48 | REMOTE OBSERVATIONS OF THE LUNAR SODIUM CORONA | KILLEN |
| | 49 | Integrating Crystal Chemistry with Laboratory Analysis to Model Bound and Adsorbed OH- and H2O | Klima |
| | 50 | Experimental Assessment of Volatiles Recovery from Carbonaceous Chondrite Materials | Gertsch |
| | 51 | Ice Cube: Determining Volatile Systematics Via Lunar Orbiting Cubesat | Clark |
| **POSTER SESSION VI** | | **ORIGIN, CHARACTERIZATION, AND EXPLORATION OF SMALL BODIES** | |
| | 52 | Investigating the Nature of S-Complex NEA Surfaces:  The Case of 1627 Ivar | Crowell |
| | 53 | The Significance of the Hale-Bopp comet to Cometary Science | GIll |
| | 54 | SHERMAN: A Shape-based Thermophysical Model for Near-Earth Asteroids | Howell |
| | 55 | New Capabilities of NASA GSFCâ€™s GEODYN for Asteroid Exploration | Mazarico |
| | 56 | NEA Characterization: Sensitivity to Solar Phase Angle | Wooden |
| | 57 | Low-Temperature Thermal Conductivity and Heat Capacity Measurements of Ordinary and Carbonaceous Chondrites | Opeil |
| | 58 | A theoretical investigation of bistatic lunar radar scattering | Zimmerman |
| | 59 | A New Lunar Digital Elevation Model From the Lunar Orbiter Laser Altimeter and SELENE Terrain Camera | Neumann |
| | 60 | Human Exploration Goals and Objectives for Phobos | Ramsley |
| **POSTER SESSION VIII** | | **Education and Public Outreach** | |
| | 61 | Dynamic Response of Environments at Asteroids, the Moon and moons of Mars (DREAM2) Education Efforts | Bleacher |
| | 62 | RIS4E Science Journalism Content | Firstman |
| | 63 | FINESSE Education and Public Outreach | Jones |
| | 64 | RIS4E Education and Public Outreach | Jones |
| | 65 | Bayeux Tapestry and Halley's Comet | Mardon |
| | 66 | Graduate Students for Education and Outreach (GEO) | Rucks |
| | 67 | MAKING CONNECTIONS: STEM + ART + ELA = ENGAGED STUDENTS | Runyon |

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| 68 | Training the Next Generation of Science Journalists through RIS4E | Selvin |
| 69 | Hypothesizing the Existence of Zhuque Family in the 5:2 Kirkwood Gap | Shaner |
| 70 | DIY Moon Base | Shaner |
| 71 | Volcanoes on the Mare and on the Highlands | Shaner |
| 72 | Hydrogen, its Possible Forms, Abundance and Probable Locations of Occurrence on the Moon | Shaner |
| 73 | Lunar Data Project / Lunar Data Node Apollo Data Restoration Update | Williams |